DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
BUILDING 77L, U.S. NAVAL BASE
PHILADELPHIA, PENNSYLVANIA 19112-5094

IN REPLY REFER TO

5090
Ser 1604/1823/FL
31 MAR 1992

State of Rhode Island and Providence Plantations
Department of Environmental Management
Division of Air and Hazardous Materials
Attn: Mrs. Cynthia Signore
291 Promenade Street
Providence, RI 02908-5767

RE: Sampling Beneath Tanks 53 and 56, Tank Farm 5, Naval Education and Training Center, Newport, RI

Dear Mrs. Signore:

On 4 February 1992, a meeting between the Navy, RIDEM, and EPA Region I was held in Providence R.I. regarding the steps necessary for Official Closure of Tanks 53 and 56 located in Tank Farm 5 at the Naval Education and Training Center (NETC) in Newport, RI. At this meeting, the EPA requested that the Navy drill 6 holes through the bottoms of tanks 53 & 56 to determine if free petroleum product is present beneath the tank floor slabs as a result of past releases. The EPA stated that this sampling is necessary to fully characterize the site.

The Navy and its consultants have examined this issue and maintain that drilling through the tank floors for the purpose of sampling for potential petroleum contaminants is unwarranted for the following reasons:

A. TANK STRUCTURE

Tanks 53 & 56 are 60,000 barrel (nominal capacity) underground storage tanks built in the early 1940's and constructed of reinforced prestressed concrete. Based on "as built" construction and engineering reports which document construction details of these and other petroleum storage tanks located at the tank farms, and the visual inspections of the interior of tanks 53 and 56 during the month of January 1992, it is unlikely that past leaks through the tank floor and walls could have occurred. There are also records which indicate:

1. Floor slabs were constructed in one continuous pour (monolithic) and therefore no joints are present which could serve as a source of leakage.

2. High strength concrete was used (4000 to 5000 psi working stress) and frequently sampled to assess strength.

3. Walls were poured to minimize joints and outside tank surfaces were sealed with a continuous cover of gunnite (ie. concrete was shot by the use of a high pressure hose onto the outside surface of the tank).

4. "As built" records that state any visible defects in the concrete work would have been repaired (at the time of construction) according to Navy construction policy.

5. The tanks are situated on a base of bedrock (shale). The bedrock at the site was blasted and the bottom of the site was leveled using mechanical shovels. Prior to pouring the tank floor at the bottom of the pit, the bottom surface of the site was leveled and covered with a concrete floor layer. This was done to provide a suitable bearing capacity area such that differential settling and hence cracking of the tank floor would be extremely unlikely to occur. No cracks or crevices of the tank floor/walls were observed during the visual inspection.

B. TANK RING DRAIN SYSTEM

If one examines potential pathways of oil migration as a result of releases originating from Tanks 53 & 56, it is difficult to explain how oil would migrate beneath the floor slab.

As previously stated, the integrity of the monolithic concrete tank floor is high and therefore not a probable source of leaks. In the most realistic worst case scenario, if a tank leak release were to occur, it would most likely be from the joint formed between the wall and the floor since this is a packed joint and is at a point which has the most pressure head acting on it. Hypothetically, if such an event were to occur, the released petroleum would tend to pool in the ring drain system (a 12 inch reinforced concrete pipe with open joints that runs the circumference of the tank parallel to the lowest point of the foundation footing and terminating in the sump pump pumping pit adjacent to the tank). This product would be seen when the ring drain system was activated to service the tank such as when sludge had to be removed from the tank bottom or if the sump was activated during high ground water conditions. If the oil loss was significant (as evidenced by the large volume in the sump pump discharge) the tank would have been inspected for cracks and repaired. Similarly, since fuel oil is less dense than water, and the water table is well above the tank bottoms, it is unlikely that oil would have "worked its way" beneath the tank floor.

C. SAMPLING LOGISTICS DIFFICULTIES

In order to sample through the existing tank floors, the following must be accomplished prior to sampling:

1. Thousands of gallons of water would need to be tested and pumped out the tanks and the tank floor squeegeed and dried.

2. The tank ring drain system would need to be activated to lower the local water table around the tanks so that hydrostatic pressure does not force water up through the sample hole during and after the hole has been drilled through the concrete. This ring drain water would require collection, analysis and perhaps treatment prior to discharge.

3. Large openings might need to be cut through the reinforced concrete roof which is approximately 9 to 13 inches in thickness. The size of these opening would be dictated by the size of drilling equipment required. Drilling apparatus would then need to be lowered into the tank down to the floor through the use of a long boom crane. It would not be feasible to use a conventional drilling rig stationed on the roof of the tank since there is over 30 feet of free space (between the roof and the floor of the tank) for the drilling shaft which most surely would buckle since there is no confining medium (such as soil) to provide lateral support to the shaft while spinning. In addition, holes would need to be cut through the reinforced concrete floor which is approximately 14 to 18 inches in thickness. The tank floor is underlain by an additional layer of lightweight concrete which exist below most tanks.

4. After sampling, the holes would require sealing to prevent the tank from filling up from local groundwater.

D. INEFFECTIVE REMEDIAL ALTERNATIVES

Many of the tanks have a bed of lightweight concrete beneath the reinforced concrete floor slab. The lightweight concrete served to level the area prior to placing reinforcing for the tank floor. This concrete was applied if the rock foundation (shale) could not be leveled mechanically such as by chipping. If oil contamination did exist in the shale or fractures thereof, it is unclear as to how this could be effectively remediated.

Based on the aforementioned information, the Navy cannot justify any sampling beneath the tank floors. The Navy and its consultant have reviewed this issue and mutually agree that the effort and costs required to accomplish this sampling are technically unwarranted. If the EPA/RIDEM can provide a logical rationale with

supporting information or other relevant factors which the Navy has not taken into account with regards to the justification of this sampling effort, then the Navy will re-examine its current position.

If RIDEM/EPA has any questions or comments regarding this correspondence, please contact Mr. Francisco LaGreca at 215-897-6280.

F. A. La Greca.

F. A. LA GRECA
Remedial Project Manager
By direction of the Commanding Officer

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